THE

HOME FRIEND;

A WEEKLY MISCELLANY OF AMUSEMENT AND INSTRUCTION.

PUBLISHED EVERY WEDNESDAY,
BY THE SOCIETY FOR PROMOTING CHRISTIAN KNOWLEDGE,
No. 4.] AND SOLD BY ALL BOOKSELLERS. [PRICE 1*d.*

SCRIPTURE TOPOGRAPHY.—THE HOLY LAND.

MOUNT CARMEL.

MOUNT Carmel is frequently mentioned in the Old Testament. Its ancient beauty is there often noticed. We read of the *excellency** of Carmel; and in the Song of Solomon, where the spiritual graces of the Christian Church are set forth under the similitude of natural beauties, we find her glory and dignity likened to the majesty of Carmel.

The prosperity or adversity of Israel is also represented by the fruitfulness or barrenness of Carmel. Thus, when foretelling God's judgments upon their nation, the prophet speaks of Carmel as *shaking off her fruits*,

* The name Carmel means "excellent vineyard," "vineyard of God;" also "harvest," "full ears of corn."

as *languishing* and *withering;* whilst future blessings were promised under the figure of a flock feeding peacefully on its goodly pastures.

In order to form an idea of the effect which such words would produce on an Israelite, we must bear in mind that almost every natural object around him was rendered sacred by its connection with some miracle or deliverance which God had wrought for his people through the instrumentality of their prophets and kings.

Such wonders had been worked on Carmel; and when the prophet pointed to its goodly top and fruitful sides (for it was the finest mountain in all Palestine), and bade the people picture it to themselves barren and desolate, with what fearful force would the prophecy come home to them, that as they had been like Carmel in glory, so should they be like Carmel cursed. . And when a captive, in a distant land, the afflicted Jew thought of his home and his country, and remembered Carmel, and the peaceful flocks feeding on its sides, how cheering would he find the promise, that he should return again to his habitation, and rest and feed on Carmel!

Carmel signifies the *vineyard;* and Jerome informs us that this mountain had good pastures. Here king Uzziah had *vinedressers* and husbandmen, "for he loved husbandry." Carmel is likewise said to mean *plantations, bushy* shrubberies, which, there is sufficient proof, formerly covered this mountain. The name Carmel is sometimes given to places planted with vines and fruit-trees, and *remarkable for fertility.*

"This mountain, the boundary of the possessions of Asher westward,* forms one of the most remarkable headlands on the whole coast of the Mediterranean. Although mentioned as a single mountain in the Scriptures, it is a straight and regular mountainous ridge, extending from eight or ten to fifteen miles from south-east to north-west; while to its more elevated part, which rises in the form of a flattened cone, and is about fifteen hundred feet in height, the name Mount Carmel is commonly applied by way of eminence. The river Kishon falls into the Mediterranean on the north side of Carmel."

"At its north end," writes Mr. Paxton, "it forms an abrupt termination in a bold promontory (advancing considerably into the sea). On the top of this promontory, and near the end, is a monastery, which has an imposing appearance, but I could see no other human habitation near it. At the distance of eight or nine miles from the promontory, the ridge called Carmel suddenly sinks down, and gives place to a wide-spread plain (the celebrated plain of Sharon). Near the south end of the mountain, they point out on the shore the site of the famous city of Cæsarea. . .

"There is a plain of varied width between Carmel and the shore. It is almost wholly destitute of trees, hardly a bush to be seen, unless of a very small size. The plain varies in width from one to two miles. Much of it was covered with sand. I saw no human being, or human habitation on it, except a few old ruins."

"The excellency of Carmel has also passed away, and the prophet's curse has fallen upon it,—and the top of Carmel has withered. Its steep sides are often barren and desolate—yet not *so* desolate as some have alleged. Wild vines and olives (showing that it had formerly been cultivated) are met with among the *brambles,*—and oaks and vines and even some cedars grow,—to attest its former luxuriance. Shepherds, too, find on its sides pasture for their flocks, as when Amos described it as their 'habitation.'"

* Josh. xix. 26.

"The lesser mountains of this group," writes D'Arvieux, "are cultivable lands, of a good soil, deep and *extraordinarily* fertile, *capable* of producing in a very uncommon degree. There were formerly many more *vineyards* than at present. The Christians who inhabit part of these villages only cultivate as many vines as may furnish what wine and dried grapes they want for their own consumption. They neglect the cultivation of fruit-trees, which here would reach *great excellence*, as may easily be inferred from those here gathered, though chiefly from wild stocks. They have delicious melons and water-melons. Those mounts which appear most dry and arid are covered with oaks and other trees. We find also olives, *but under no management*. The air of these mountains is very good; and how sultry soever it may be on the border of the sea, these regions are refreshed every morning by a cool sea breeze. On the mountains feed numbers of beeves, sheep, goats, hares, rabbits, partridges, antelopes, and other species of animals, all excellent in their kinds, because they here find *excellent pasture* and corn."

What a commentary is this upon the prophet's words, when he speaks of the *excellency* of Carmel and of its *languishing!*

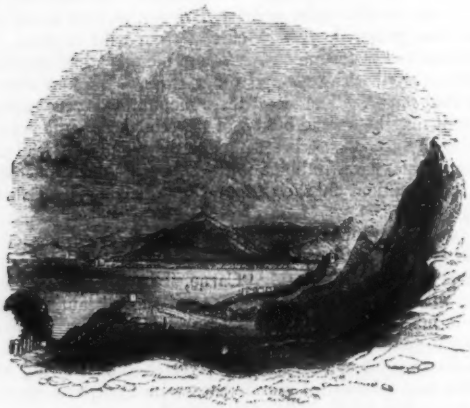
"Carmel is no place," says Mr. Carne, "for crags and precipices, or rocks of the wild goats; it is the finest and most beautiful mountain in Palestine,—in many parts covered with trees and flowers. On reaching at last the opposite summit, and coming out of a wood, we saw the celebrated plain of Esdraelon beneath, with the river Kishon flowing through it. Mounts Tabor and (the little) Hermon were in front, and on the left the prospect was bounded by the hills of Samaria."

Lamartine thus describes a storm on Mount Carmel:—"I have witnessed few so terrible. The clouds rose perpendicularly, like towers above Mount Carmel, and soon covered all the length of the summit of this chain of hills. The mountain, just now so brilliant and serene, was plunged by degrees in rolling waves of darkness, split here and there by trains of fire. The horizon seemed to close around us,—the thunder did not burst in claps—it threw out one single majestic rolling, continual and deafening. The lightning might be truly said to rush like torrents of fire from the heavens, on the black flanks of Carmel. The oaks on the Mount and on the hill on which we were journeying, bent like young plants. The winds, which rushed from the caverns, and from between the hills, must have swept us from our horses, if we had not speedily alighted, and found a little shelter behind a fragment of rock in the then dry bed of a torrent. The withered leaves, upraised in masses by the storm, were carried above our heads like clouds, and the slender, broken branches of the trees showered around us. I remembered the Bible, and the prodigies of Elijah... The storm abated in about half an hour. We continued our route along the foot of Mount Carmel, which we traced in this way, during a march of about four hours. It presented everywhere the same severe and solemn aspect. It is a gigantic rock, rising almost perpendicularly, and everywhere covered by a bed of shrubs and odoriferous herbs. The rock is seldom entirely naked."

"In Leviticus xxvi. 22, we read that wild beasts were to be sent amongst the people of that land for their iniquities; even that seems well nigh its accomplishment. The monks of Mount Carmel reported, that in consequence of the disarming of the people, and the great decrease of their numbers, wild beasts were increasing on Mount Carmel to an alarming degree."

"We may stand at the top of Carmel," observes Mr. Hardy, "as did

Gehazi, and look towards the sea, but, alas! there is now no 'little cloud like a man's hand;' still there is the promise of a shower, and in due time the streams of divine mercy will again fall upon this thirsty land, and men shall liken themselves in their prosperity to the 'excellency of Carmel and Sharon.'"



View from Carmel.

EVIL EFFECTS OF COMBINATIONS.

It would be an object of national utility could the truth be impressed on the minds of the working classes, that their combinations, in place of being advantageous, have almost invariably proved prejudicial to themselves.

In the first place, they are a perpetual drain upon their earnings. Each member of a union is required to pay a given sum out of his wages, varying from 3*d*. to 1*s*., 2*s*. and even as much as 5*s*. weekly.

When on strike, the regulations generally are, that workmen shall receive from 7*s*. to 10*s*. weekly; but, in practice, they seldom get more than a mere pittance, barely enough to support existence. A large proportion of the fund thus wrung from the workpeople goes to pay secretaries and delegates, who receive from 3*s*. 6*d*. to 5*s*. a day, and have their travelling expenses paid in addition. Thus wofully do these men prey upon the resources of the workmen whom they mislead! After weeks, nay, perhaps, months of idleness and privation, they have invariably been obliged to return to their work, in many cases at less wages, but never at more than they turned out for.

In the next place, a strike invariably introduces new workmen into the trade, and thus increases the number of labourers, without, at the same time increasing the fund for their maintenance. In consequence of the turn-out at Ashton, in 1825, more than 300 persons were instructed in spinning; and every turn-out has ended in a reduction of wages immediately afterwards, in consequence of the influx of fresh hands causing a superabundance of labour. Not all the violence of unionists can prevent this natural course of things from taking place. Thus is exemplified what

you have already been told, namely, "that wages can only be altered by changing the proportion between the number of labourers, and the funds set apart for their maintenance."

In the third place, strikes have been the cause of the invention and introduction of machinery, the effect of which has been to supersede the labour of men. Such was the invention of the wool-combing machine, which has enabled manufacturers to free themselves in a great measure from the dictation of those whom they employ. This occurred in consequence of a strike at the factory of a well-known manufacturer at Leeds, in 1833; and this at a time when the families employed by him were earning at the rate of nearly thirty shillings a-week. Another strike of the same kind in 1835, amongst the boiler-riveters of a Manchester manufacturer, at a time when he was under heavy engagements, produced the invention of a machine to rivet boilers by steam pressure; and such was the success of the attempt, that the master in question was enabled to proceed with his work with so increased a degree of rapidity and precision, as to dispense with the turn-outs altogether. Thus they found, to their cost and vexation, that they had for ever lost the employment of a kind and generous master.

A third instance of the same kind may also be cited, namely, the introduction of the self-acting mule, superseding the labour of the spinners. This occurred in consequence of a turn-out of these workmen in 1824, by which immense numbers of the working classes, whose labour depended upon that of the spinners, were forced to leave their employment. This machine has not only secured the trade from the frequent strikes to which it was subject, but it has proved much more economical, causing less waste, fewer breakages, and enabling the weaver to turn off more from his loom.

In the fourth place, strikes have been the cause of manufactures being altogether driven from the places where they were originally established. Of this numerous instances may be given. In consequence of the high wages demanded by the silk-weavers in Spitalfields, the manufacture was removed to Macclesfield and Paisley; and Macclesfield, in turn, has lost part of its silk trade to the benefit of Manchester, from the same causes that had before driven it from London. Some manufacturers have lately left Coventry, owing to the continual annoyances from strikes to which they were exposed in that town, and established factories in Essex. The carpet trade has been seriously injured by the strikes in Kidderminster, and has, in consequence, partly migrated to Kilmarnock. But, perhaps, Ireland has suffered more than any other country in this way, by the folly of its working population. Owing to the Union in Dublin, planks can be cut into boards nearly five per cent. cheaper in Liverpool than in that town; and, consequently, ship-building, which had long lingered in Ireland, has now deserted the shores of that island almost entirely. Some time ago, an Irish manufacturer required for his business several large metal utensils, and being desirous that his own country should have the profit of supplying them, he called upon the master of some iron works, and stated his readiness to sacrifice a considerable per centage, rather than that the order should be sent from the country. The master informed him that he was incapacitated from manufacturing the articles, even at the proposed advance of price; and that he was prevented from competing with his English rivals, not from any want of coal, or from any local advantages that were possessed on the other side of the channel, but solely on account of the combinations by which he was beset. The result was, that the manufacturer was obliged to have recourse to the English market.

An extensive iron-master in Dublin, Mr. R., constructed several years ago a machine for the manufacture of nails; the nail-makers determined to prevent its use, and got the workmen in those trades in which nails are used, to pass a resolution that they would not work with any that had been made by this machine. Consequently, machine-made nails from Birmingham quickly drove the Dublin ones out of the market; the manufacture of nails left the latter place altogether, and has, I believe, never returned. The blanket manufacture at Kilkenny has almost entirely left that town, because, as soon as the workpeople discovered that a manufacturer had a contract for making blankets, or that there was a demand for goods, they immediately struck, and would not work unless for very high prices: hence the manufacturers were unable to enter into contracts lest they should be disappointed, and the manufacture went down altogether. In 1821, the colonel of a regiment of dragoons gave an order for some saddles to an army accoutrement maker in Dublin. The master-saddlers in that city, on learning the circumstance, declared it was an encroachment upon their trade, and incited the journeymen who were to perform the work to turn out against their master, who was in consequence, compelled to give up the contract. The saddlers, however, did not profit by their conduct, as none of them got the order, which was thus lost to Ireland altogether.

JOSEPH ADDISON.

Joseph Addison the son of Launcelot Addison, D.D., was born on the 11th of May 1672, at Milston, a village in Wiltshire. His father, the rector of that place, and afterwards prebendary of Sarum, dean of Lichfield, and Archdeacon of Coventry, was a man of great natural abilities, and author of several works, which evince that his literary attainments were of no ordinary character. The subject of this memoir received the first rudiments of education at the place of his nativity, under the tuition of Mr. Naish, a clergyman, but was soon removed to Salisbury, and from thence to the Charter-house. At fifteen he was entered at Queen's College, Oxford, where he applied very closely to the study of classical learning, in which he made a surprising proficiency.

In the year 1687, Dr. Lancaster, dean of Magdalen College, having, by chance, seen a Latin poem of Addison's, was so pleased with it that he immediately got him elected into that college, where he took the degrees of Bachelor and Master of Arts. His Latin pieces, in the course of a few years, were exceedingly admired in both the Universities, nor were they less esteemed abroad, particularly by Boileau, the celebrated French author.

who was first led to think highly of the English genius for poetry by their perusal. He published nothing in English before the twenty-second year of his age, when there appeared a copy of verses written by him to Dryden, which met with great approbation from the best judges.

At the Charter-house school he first formed that intimacy with Sir Richard Steele, which their joint literary labours afterwards so effectually recorded. Addison was strongly pressed, when at the university, to enter into holy orders, and had once resolved upon doing so; but his great modesty, his natural diffidence, and an uncommonly delicate sense of the importance of the sacred office, joined to the advice of his friend, Mr. Montague, the Chancellor of the Exchequer, made him afterwards alter his resolution. Having expressed to one of his patrons, Sir John Somers, a great inclination to travel, that gentlemen, by his interest, procured him a pension from government of three hundred pounds a-year to defray his expenses. He accordingly made a tour to Italy in the year 1699, and two years after wrote a poetical epistle from that country to the Earl of Halifax. In 1702 he was about to return to England, when he received an appointment to attend Prince Eugene, then in command of the Imperial troops in Italy; but the death of William the Third happening soon after, put an end to this affair, as well as to his pension, and he remained a considerable time unemployed. During this period, however, Addison was not idle, but sedulously applied himself to the cultivation of his mind, until at length an unexpected incident gave him an opportunity of displaying his talents to advantage. Lord Godolphin, happening to complain to Lord Halifax that the Duke of Marlborough's victory at Blenheim had never been celebrated in verse in the manner it deserved, asked that nobleman if he could name a person capable of doing justice to the subject. Lord Halifax replied that he did know of such a person, but refused to mention him, "Because," he added," "I have long seen with indignation, men of no merit maintained in luxury at the public expense, while those of real worth and modesty are suffered to languish in want and obscurity."

To this the Lord Treasurer answered that he was sorry there should be occasion for such a remark, but that he would do his best to wipe off such reproaches for the future; and, on his pledging his honour that whoever his lordship named as adequate to the task should be suitably recompensed, Lord Halifax mentioned Addison.

The proposal was, by direction of the Treasurer, made to our author by Mr. Boyle, in so polite and flattering a manner, that he readily accepted it. Lord Godolphin having seen the first part of the work before the whole was finished, was so pleased with it, that he appointed him Commissioner of Appeals.

The ensuing year, he accompanied Lord Halifax into Holland, and in 1706 was made private secretary to the Secretary of State, in which office he acquitted himself ably.

About this time, there being a great taste for Italian operas, he wrote the opera of "Rosamond," wishing to try the effect that a composition of this sort with English words would have upon the stage; but, probably owing to the badness of the music to which it was adapted, this undertaking did not succeed.

On the 1st of March 1711, the first number of the "Spectator" made its appearance. Of the extraordinary popularity of this celebrated periodical, the fact that more than twenty thousand copies were often sold in one day would alone bear sufficient testimony.

But although his literary fame was raised very high by the publication of the "Tatler" and "Spectator," the former of which works is supposed to have been commenced by his friend Steele whilst he was in Ireland, without his knowledge, yet it was not until the appearance of "Cato" that his reputation reached its greatest height. This celebrated tragedy was planned by the author when he was very young, and principally written abroad. For a long time he had no intention of bringing it forward on the stage, but at length, yielding to the earnest and frequently repeated solicitations of his friends, it was exhibited at the theatre, with a prologue written by Pope. It met with uncommon success, being played thirty-five nights without interruption, and then discontinued only on account of the illness of one of the principal actors. "Cato" was no less admired on the Continent, having been translated into French, Italian, and German. It was acted at Leghorn, and several other places, with immense applause; and the Jesuits of St. Omer made a Latin version of it, which was got up with great magnificence, and acted by the students of the college.

Before the arrival of George the First, Addison was made Secretary to the Regency, and was required by his office to send notice to that monarch of the death of Queen Anne, and the vacancy of the throne of England. He was so long in performing this, thinking that such a subject required so much consideration as to the best manner of expressing it, and was so perplexed with the choice of terms, that the lords, who could not be thus kept waiting, called a man of the name of Southwell, a clerk in the house, and desired him to despatch the message. Southwell readily wrote what was necessary, in the common-place style of business and boasted that he had performed what was too difficult for Addison. A striking instance of absurd and overweening self-conceit is here afforded us; and it may also be remarked how much more frequently this defect is found in ignorant and inferior minds than in those who are justly distinguished above the common herd for wisdom and learning.

In 1716 Addison married the widow of the Earl of Warwick, whom he had long courted. It seldom happens that unequal marriages are productive of happiness to either party; and this was exemplified in the case of Addison and his wife. He first became acquainted with her from being tutor to her son; and the lady always remembered her own rank, and treated her husband with very little consideration.

The year after this ill-assorted union Addison rose to his highest elevation, being made Secretary of State, but appears to have proved himself unequal to the duties of his situation. Having no powers of oratory, he could not speak in the House of Commons; and in the office he could not issue an order without losing his time, and causing inconvenient delay, by waiting to express it in fine and elaborate language. Finding, by experience, his utter inability for public business, he solicited his dismission, which was granted, with a pension of 1,500*l.* a year.

In his retirement, although suffering from declining health, he applied himself with diligence to the completion of a work entitled "Evidences of the Christian Religion," and intended to have made an English paraphrase of some of the Psalms. But his complaints, asthma and dropsy, increased, and he was forced, reluctantly, to abandon his designs. He died on the 17th of June 1719, at Holland House, in the forty-eighth year of his age.

Pope relates, that during his last illness, he sent for the poet Gay, who had not visited him for some time before. Addison told him that he had injured him, but that, if he recovered, he would make him full amends.

What this injury was he did not explain, nor did Gay himself ever know. It is supposed, however, that some piece of preferment intended for Gay was withheld in consequence of Addison's interference. Another death-bed interview, of a more solemn nature, is also recorded. It should first be mentioned that his son-in-law, Lord Warwick, was a very wild young man, of libertine and irregular habits, and possessing no fixed principles. He, notwithstanding, entertained sentiments of considerable respect for Addison, who had used great exertions to reclaim him; but his good advice and kind admonitions had no effect upon the young man. Determined to try once more, Addison, when he found that he had but a short time longer to live, sent for Lord Warwick, who lost no time in hastening to his bed-side, and much affected, desired to hear his last wishes and injunctions.

"I have sent for you," said Addison, "that you may see how a Christian can die."

It would be interesting to know what effect this awful scene had upon the dissolute young earl; we may hope that it led him to serious thought and sincere repentance, but of this we have no account. It is certain that, if he proposed reformation and a change of conduct, no time was allowed him to put his good resolutions in practice, for very shortly after the death of his father-in-law he himself died.

It has been observed by several of Addison's biographers, that he employed wit on the side of virtue and religion. His writings did much towards improving the depraved manners, and checking the vicious habits, prevalent in his day, and mingled instruction with amusement in a striking degree.

He had the distinguished merit of being the first author who sought to reform and improve the age in which he lived, by boldly censuring its vices and exposing its follies, yet in so clever and agreeable a manner as to render his writings eagerly perused by all classes.

Dr. Johnson says, in his Life of this great man, "Before the 'Tatler' and 'Spectator,' if the writers for the theatre are excepted, England had no masters of common life. We had many books to teach us our more important duties, and to settle opinions in Philosophy or Politics, but an *Arbiter Elegantiarum*, a judge of propriety, was yet wanting, who should survey the tract of daily conversation, and free it from thorns and prickles which tease the passer, though they do not wound him.

"For this purpose," he adds, "nothing is so proper as the frequent publication of short papers, which we read not as study but amusement. If the subject be slight, the treatise is short. The busy may find time, and the idle may find patience."

One of his contemporaries relates an anecdote of him, which may amuse our readers. Addison was very intimate with Mr. Temple Stanyan, author of a history of Greece. In the familiar conversations which the two friends frequently had together, they were accustomed to dispute each other's opinions, without reserve. It once happened that Addison lent Mr. Stanyan five hundred pounds. After this, Stanyan, instead of conversing with the same frankness and canvassing his friend's opinions with the same freedom as formerly, became constrained, deferential, and timid in his manner. This change gave Addison great uneasiness. Matters had continued thus some time, when one day, in discoursing together, a subject was introduced on which Stanyan had been used strenuously to oppose his friend's opinion; but now, even upon this point, he gave way to what Addison advanced, without attempting to dispute what he said, or interposing his own view of the case.

This annoyed and hurt Addison so much, that he exclaimed, "Either contradict me, or pay me the money!"

There is much in the character of Addison that merits our admiration. Among his many good qualities may be mentioned a high sense of honour and unimpeachable integrity, although tempting bribes were frequently offered him by those who wished to secure his assistance and interest with the Court.

The following letter affords so pleasing an illustration of his feeling upon one of these occasions, that we will conclude this short memoir by quoting it. It relates to the case of a Major Dunbar, whom he had sought to serve when in Ireland by his interest with Lord Sunderland, and from whom he had previously refused to accept, first, a three hundred pound bank note, and then a diamond ring of the same value.

"Sir,—I find there is a very strong opposition formed against you, but I shall wait on my lord lieutenant this morning, and lay your case before him as advantageously as I can, if he is not engaged with other company. I am afraid what you say of his Grace does not portend you any good. And now, sir, believe me, when I assure you, that I never did, nor ever will, on any pretence whatsoever, take more than the stated and customary fees of my office. I might keep the contrary practice concealed from the world, were I capable of it, but I could not from myself; and I hope I shall always feel the reproaches of my own heart more than those of all mankind. In the meantime, if I can serve a gentleman of merit, and such a character as you bear in the world, the satisfaction I meet with on such an occasion is always a sufficient, and the only, reward to,

"Sir, your most obedient humble servant,

"J. ADDISON."

THE BEAVER.

THE Beaver (*Castor fiber*, LINN.) is found both in Europe and North America: and, as late as the twelfth century, was an inhabitant of Great Britain. On the continent of Europe it has become scarce, but in the northern parts of America it is still numerous, though immense numbers

are killed annually for their skins. Formerly from 100,000 to 200,000 beaver skins were imported yearly into Europe, but the present amount is much diminished.

The most interesting point in the history of this animal is its instinctive association for the purpose of building structures of considerable size and durability. These are habitations for winter residence, and dams for maintaining an equable depth of water. The latter are not needed when the beaver-house is erected in a pond or lake, or broad river; but these situations are less frequently chosen than a narrow stream, as in the latter case the current enables the animals to float down materials, besides affording them additional security. If there is a probability of the water diminishing by reason of the freezing of the source, they display wonderful sagacity in forming a dam quite across the river at some distance from their house. If the current be sluggish, the dam is nearly straight, but if it be rapid, additional strength is imparted to the structure by making it convex towards the stream. The materials used are drift-wood, or young trees cut down by the sharp cutting teeth of the Beavers, and gnawed into lengths, with mud and stones dragged from the banks and bottom, the whole intermixed without any regularity, except that which preserves the general sweep of the dam. The sticks are not forced into the bottom as has been pretended, but are laid horizontally, and are kept in their places simply by the weight of the stones and mud laid over them. "In places," says Hearne, "which have been long frequented by Beavers undisturbed, their dams, by frequent repairing, become a solid bank, capable of resisting a great force both of water and ice; and as the willow, poplar, and birch, generally take root and shoot up, they by degrees form a kind of regular planted hedge, which I have seen in some places so tall that birds have built their nests among the branches."

The huts are built in the same general manner, projecting from the bank, or from an islet in the stream; a spot being always selected where the water is at least three or four feet deep, to prevent the effects of severe frost. They are of a round form, with the summit, which rises to the height of several feet above the surface, domed over. The sides are enormously thick; Hearne speaks of one which was "more than eight feet thick in the crown." A single entrance is made, which is covered with a projecting porch; and this is invariably at some considerable distance beneath the surface. "It is a great piece of policy," remarks the accurate observer already quoted, "in these animals, to cover the outside of their houses every fall with fresh mud, and as late as possible in the autumn, even when the frost becomes pretty severe, as by this means it soon freezes as hard as a stone, and prevents their common enemy, the wolverine, from disturbing them during the winter; and as they are frequently seen to walk over their work, and sometimes to give a flap with a tail, particularly when plunging into the water, this has, without doubt, given rise to the vulgar opinion that they used their tails as a trowel, with which they plaster their houses; whereas that flapping of the tail is no more than a custom which they always preserve, even when they become tame and domestic, and more particularly so when they are startled."

The food of the Beaver consists in summer of the bark of the willow, birch, and poplar; but as in the winter the ice confines them to their habitations, or the bottom of the water, they are able to indulge in this food only so far as they have in the summer cut down green trees, and thrown them into the water in front of their door. At this season their chief

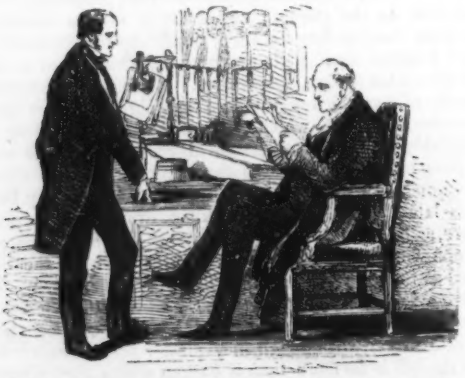
support is the fleshy root of a large species of water-lily. This root imparts a rank taste to their flesh, which is at other times in high estimation.

The Beavers which are found in the European rivers are for the most part solitary, and dwell in burrows in the banks. They have hence been supposed to be destitute of the building instinct, and therefore specifically distinct from those of America. But the recent discovery of a colony of building Beavers on a little tributary of the Elbe has dispelled this notion, for these were found to inhabit houses of eight or ten feet in height, and to have constructed a dam which raised the water more than a foot; while their work was in no way inferior to that of their western brethren.

An anecdote related by M. Geoff. St. Hilaire of a Beaver from the Rhone, which was kept in the Paris menagerie, also illustrates this instinct in an European individual. "Fresh branches were regularly put into his cage, together with his food, consisting of legumes, fruit, &c., to amuse him during the night, and minister to his gnawing propensity. He had only litter to shield him from the frost, and the door of his cage closed badly. One bitter winter night it snowed, and the snow had collected in one corner. These were all his materials, and the poor Beaver disposed of them to secure himself from the nipping air. The branches he interwove between the bars of his cage, precisely as a basket-maker would have done. In the intervals he placed his litter, his carrots, his apples, his all, fashioning each with his teeth, so as to fit them to the spaces to be filled. To stop the interstices, he covered the whole with snow, which froze in the night, and in the morning it was found that he had thus built a wall which occupied two-thirds of the doorway.*

* Mém. du Mus. d'Hist. Naturelle, xii.

IT WILL DO TO-MORROW.



It is a bad plan to draw upon the future for the power to do that which we are capable of performing to-day. "Whatsoever thy hand findeth to do, do it with thy might; for there is no work, nor device, nor knowledge, nor wisdom, in the grave, whither thou goest,"—is a maxim of wisdom and truth which none can controvert. The present, and the present only, is in any sense our own; for "The morrow is a space of time to be found only in the fool's calendar."

"It will do to-morrow." This belief, if it really amounted to any feeling of the kind, was the bane of Edward Collinson from his earliest youth. Whatever depended upon himself was invariably deferred; in consequence of which he was, what he termed himself to be, "the most unfortunate fellow in the world, always out of luck's way,"—but one whom wiser persons than he looked upon only as the just victim of procrastination. At school he never distinguished himself, though he had very fair abilities; and when he became a clerk in a mercantile house, he never gained a step but as he rose by regular rotation, and that simply because he failed in promptitude.

His family were respectable, but far from affluent, all the members of it being called upon to exert themselves for their own maintenance as soon as they were able. Himself and his two next brothers were provided for; it was now a great point to dispose of the fourth son suitably. Many disappointments had occurred, and but few *real* opportunities of success presented themselves. At length a vacancy took place in the house of Williams & Co., where Edward had now been fixed two or three years. His father was well known to the parties; and as he himself bore the character of a very steady young man, and in consequence stood well with his superiors, an application in favour of his brother seemed very promising. As no time was to be lost, and Mr. Collinson was unable to call upon Mr. Williams, he wrote a letter to that gentleman, strongly urging him to regard his request favourably, and committed it to the care of Edward, with a strict injunction that he should deliver it himself immediately on his reaching the house of business.

Mr. Williams happened to be later than usual before he arrived, and Edward in the meantime had been despatched to the London Docks. Here he was detained some time; then recollecting that he had omitted to call the day before on some parties connected with the firm, he still further delayed his return by going to speak to them. When he again reached —— Lane, he found on inquiry that Mr. Williams was preparing to leave; still, more than sufficient time was allowed him to deliver both message and letter, as his father had desired, without intruding upon his superior's arrangements. He was preparing to step forward, when seeing Mr. Williams lock his desk, and about to take his hat, he at once changed his intention. "It will do just as well to-morrow," said he; "my father is always so pressing in these things; and Mr. Williams will not thank me for keeping him. Now a few hours can make no difference." So reasoning he put the letter into his own desk, and saw Mr. Williams depart without further concern.

The next morning he requested leave to speak to Mr. Williams almost as soon as he arrived. He presented the letter to him, and was about to deliver the message with which he was also charged, when Mr. Williams, who had glanced his eye over the contents, prevented him, by exclaiming, "How very vexatious! There is nothing that would have given me more pleasure than to have acceded to your father's wishes; if I had but known them yesterday, your brother should have had the situation. It was only this very morning, just before I left home, that a gentleman called on me in favour of his nephew, and, having no one particular in view, I promised it at once to him. Assure your father that I am really very sorry for the circumstance."

So was Edward *very sorry;* but it was of a piece with everything else he undertook; if another person had anything to do with it, he would have been certain to suceeed; his old luck stood by him, if nothing else did.

Some time afterwards Mr. Williams was desirous of sending out a trust-

worthy young man to his partners abroad. Edward had always entertained a strong desire to visit foreign lands; and as peculiar advantages were attached to the present proposal, he was very eager to secure it. "Apply for it directly," was the advice of a friend; "there are several about it; but I have reason to think Mr. Williams expects you to make application for it, and would listen favourably to you." Edward professed thankfulness for the encouragement, determined on speaking immediately to Mr. Williams; and he did so; not that day indeed, there was no need for such haste as that, but on the next.

"Why didn't you speak to me before?" said Mr. Williams. "I have actually promised Nelson only an hour ago to send him out."

"Was there ever anything so unlucky?" said Edward, as he finished relating the circumstance to his friend by whose advice he had acted. "I am sure there is a spell against me."

And truly there was a spell against him, stronger than any incantation could make it; a spell which can render the strong man's intentions as flax, and destroy, without noise and without effort, the noblest fabric of man's wishes and intentions. If "procrastination be the thief of time," so is it also the ruin of his best-laid schemes.

When Edward had been some time longer in his present situation, his father met with losses in his profession, which ended alike in his ruin and his death. He left a widow and two daughters, totally unprovided for, and therefore dependent upon Edward as far as he was able to render them assistance. To add to his misfortunes, Mr. Williams at this time was thrown from his horse, and so much injured as to die almost immediately afterwards. The concern was soon after wound up, and Edward was left without employment. For some weeks he was thus painfully circumstanced; his old luck continuing, as he said, to follow him. Let him apply to whom, or for what he might, he was always only a few hours too late. So certain was he that it was of no use for him to seek after anything, that he really thought he might as well give himself no further trouble. At last, however, through the interest of some friends, he obtained a very good situation in a house formerly connected with the late firm of Williams & Co., in Jamaica.

Before he left the country he assured his life for as large a sum as he was able, as a provision for his mother and sisters in case of his death. "Come what will," said he to them, "I have this satisfaction, that if you lose me, you will yet have something to depend upon." It was a sad parting between him and his family, for he was very affectionate, and was tenderly loved in return by his relations. His mother, in particular, seemed to suffer at the idea of separation, and by every argument in his power he sought to soothe her, and to reconcile it to her mind. His last words to her were, "My dear mother, if I did not see you thus distressed, I should leave you with cheerfulness, because I go in the full hope of being able to assist you materially, and perhaps eventually to restore you to the position in life you have been accustomed to occupy; for who can tell? Why may I not be as sucessful, after all, as many others have been, and return in a few years a rich man, make your old age comfortable and happy, provide for my sisters if they should not be already provided for, and leave for ever my ill luck to the scorching sun and the yellow fever?"

So spake Edward, and his mother clung to the comfort his words imparted; she repeated them to her friends, breathed them on her pillow, and at last persuaded herself that they were prophetical. The idea soothed her; and who would have wished to substitute painful reality for pleasurable

anticipation? Our life is, indeed, but as a vapour, over which the gleamings of hope diffuse a bright though illusory splendour, cheering to the eye and soothing to the heart; and as such may well be permitted to the sufferer and the bereaved, the afflicted and the weary.

Edward's "ill luck," however, on many occasions continued to follow him. Once in particular he had nearly lost his situation through his pertinacious belief that to-morrow would do as well as to-day. He was desired to see a person who was on the eve of sailing for England. The vessel had been detained many days by a contrary wind, and this evening there was a dead calm. It was absurd therefore to give himself any unnecessary trouble about the matter; there lay the vessel, and there it would lie; he would execute his orders early the next morning. But a breeze sprang up in the night, and increased to a steady and favourable gale; and when Edward, as soon as he rose, looked out of his window, the fluttering streamer was all that was visible to his eye. Would this have happened to any other person? No; he was sure it would not. No matter where he went, he believed, he always was, and he feared always would be, the most unlucky fellow in the world.

In the meantime his mother and sisters, in spite of the assistance he gave them, and which, to his credit be it recorded, was to the utmost extent of his power, experienced much discomfort, and were compelled to endure many privations. All exerted themselves for a maintenance; but females are sadly circumscribed in this respect, and their most strenuous efforts are often insufficient to procure more than a miserable pittance. To add to their troubles, Mrs. Collinson's health began to fail; and there were necessaries as well as indulgencies, the want of which was severly felt. Much as they concealed from their brother, a tone of melancholy, if not despondency, began to show itself in his sisters letters.

One of the partners of the house, Mr. Mason, pleased with Edward's amiable manners and correct conduct, took a great liking to him, and showed him on all occasions marked kindness. There was no reserve in Edward's disposition; and, won by Mr. Mason's condescension, he soon communicated to him all the circumstances of himself and family. With a generosity that distinguished him, that gentleman, on hearing of Mrs. Collinson's illness, immediately advanced him a sum of money for her use. Nothing could have come more opportunely than this loan. He had remitted nearly all his quarter's salary to his mother by the last packet, and the premium of his assurance was now due. If he recollected right, he had yet a few days' grace; he would look when he reached his lodgings, and if necessary he would call at the office and pay it, perhaps that evening, or as soon after as possible. He searched for the notice, but was unable to find it; no matter, he would stop on his way to business in the morning, and pay the premium at once. He did so—not that day but on the following. "Your policy expired yesterday," was the reply of the clerk to whom he tendered the money. "I am very sorry; but it is no fault of ours; the proper notice was given you."

"This is the crowning height of my ill luck," cried Edward; "never was such an unlucky wight born as my unfortunate self." And with a heavy heart he entered the office, and seated himself at his desk. There, to his surprise, lay a letter directed to him; it having been transmitted by the writer to the care of Messrs. Warren & Mason. He opened it; when what was his astonishment and delight when he found it to be an official letter from a solicitor, informing him that a distant relation of his name,

whose death he announced, had left him sole heir to his property, which was something considerable; in the event, however, of his dying without issue, a more distant branch still than himself was to inherit it. As Mr. Collinson had died in a distant colony, four months had elapsed since the news had reached England; in consequence of which, a pretty large sum of ready money was at Edward' disposal at the present time.

With a heart bounding with pleasure and gratitude he hastened to Mr. Mason, and put the letter into his hand. The kind-hearted man having read it, warmly congratulated him on his good fortune.

"O! it is not for myself," cried Edward, "that I feel thus happy. My mother, my dear mother and sisters!"—the tears rushed into his eyes, and he paused;—"they shall now be as independent as myself," he resumed with cheerful voice; "for you will observe, Sir, that I have it now in my power to provide handsomely for them."

"Lose no time, then," returned Mr. Mason; "the sooner you execute your intentions the better."

"I will give the necessary instructions immediately," cried Edward; "I will see Mr. Pearson about it to-morrow."

"To-morrow!" repeated Mr. Mason, fixing his eyes upon him with a grave and almost stern expression of countenance; "there is no to-morrow, Sir, in a climate like this, both you and I may be inhabitants of another world before the close of another day. Till something better can be done, write a memorandum of your intentions, and have it attested before you close your eyes." Edward promised to do so—took out his papers—reflected for a few moments how he should express himself—made a commencement—thought himself not quite well—he could do what he wished better after a night's rest. He threw down his pen, and retired to bed.

The next morning Edward's seat was vacant. Mr. Mason sent to his lodgings—he had been attacked with fever, and was even then in imminent danger. The best medical advice was procured, but in vain; in a few hours he breathed his last, and "to-morrow's" sun shone on his grave.

MAN.

Oh! what is man, great Maker of Mankind!
That thou to him so great respect dost bear:
That thou adorn'st him with so bright a mind,
Mak'st him a king, and ev'n an angel's peer?

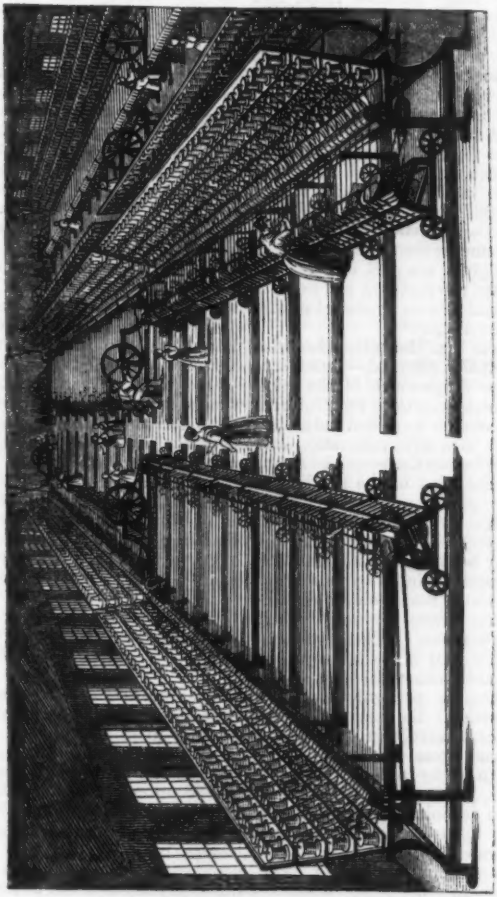
Oh! what a lively life, what heavenly pow'r,
What spreading virtue, what a sparkling fire;
How great, how plentiful, how rich a dow'r,
Dost thou within this dying flesh inspire!

Thou leav'st thy print in other works of thine,
But thy whole image thou in man hast writ;
There cannot be a creature more divine,
Except, like thee, it should be infinite.

But it exceeds man's thought, to think how high
God hath rais'd man, since God a man became;
The angels do admire this mystery,
And are astonish'd when they view the same.

Nor hath he given these blessings for a day,
Nor made them on the body's life depend:
The soul tho' made in time, survives for aye;
And tho' it hath beginning, sees no end.

Sir John Davies.



MULE SPINNING.

MANUFACTURE OF COTTON YARN.

PART II.

THE locality of a manufacture is usually determined by the facility with which water-power, fuel, and iron can be obtained; for, where they are abundant, machinery can be made and put in motion at small cost: and, in this respect, many parts of Lancashire and its neighbourhood are highly favoured. There is perhaps no spot of ground in the world more advantageously situated for manufactures

than the tract lying between the Ribble and the Mersey. The neighbouring hills pour down a number of rapid streams, which furnish water-power to many hundred mills, feed navigable canals, supply water for scouring, bleaching, printing, dyeing, and other processes. The river Irwell is said to be "the hardest-worked river in the universe:" for, besides washing, bleaching, dyeing, &c., it is calculated to move, with its tributaries, not fewer than three hundred water-wheels, some of which are of very large size. South Lancashire is rich in coal-fields, which are worked with great ease and economy; the neighbouring counties furnish abundance of iron; the great sea-port of Liverpool supplies the raw material, and exports the beautiful fabrics produced in this industrious district.*

Here it is that the cotton factories are principally situated,—those stupendous buildings which fill the mind with astonishment, until their internal arrangements are inspected and understood, and then with admiration and delight. Whether the power be steam or water, the plan of the building is the same. A cotton factory is a huge square structure, often containing seven or eight stories, the rooms of which may be two or three hundred feet in length, lighted by numerous windows, which have a singularly picturesque appearance by night, when seen from without. "The operations carried on within its walls," says Mr. Baines, "are numerous, and every one of them is performed by machinery, without the help of human hands, except merely in transferring the material from one machine to another. It is by iron fingers, teeth and wheels, moving with exhaustless energy and devouring speed, that the cotton is opened, cleaned, spread, carded, drawn, roved, spun, wound, warped, dressed, and woven. The various machines are proportioned to each other, in regard to their capability of work, and they are so placed in the mill as to allow the material to be carried from stage to stage with the least possible loss of time. All are moving at once, the operations chasing each other; and all derive their motion from the mighty engine, which, firmly seated in the lower part of the building, and constantly fed with water and fuel, toils through the day with the strength of perhaps a hundred horses. Men, in the meanwhile, have merely to attend on this wonderful series of mechanism, to supply it with work, to oil its joints, and to check its slight and unfrequent irregularities; each workman performing, or rather superintending, as much work as could have been done by two or three hundred men sixty years ago. At the approach of darkness, the building is illuminated by jets of flame, whose brilliance mimics the light of day, the produce of an invisible vapour generated on this spot. When it is remembered that all these inventions have been made within the last seventy years, it must be acknowledged that the cotton mill presents the most striking example of the dominion obtained by human science over the powers of nature, of which modern times can boast. That this vast aggregate of important discoveries and inventions should, with scarcely an exception, have proceeded from English genius, must be a reflection highly satisfactory to every Englishman."

* A considerable quantity of manufactured cotton goods is also exported from the ports of London, Hull, Bristol, and Newcastle-upon-Tyne.

SORTING THE COTTON, WILLOWING, BATTING, BLOWING, AND LAPPING.

The importers of cotton employ certain brokers in Liverpool, who set a value upon the sample, and find purchasers to any amount. The buyers, who are the spinners all over the country, and the Manchester cotton dealers, also employ brokers to make their purchases. The broker's charge, both to seller and buyer, is commission of ten shillings for every hundred pounds worth of cotton.

The cotton is seldom unpacked until it arrives at the mill, the purchases being all managed by samples. When it is unpacked, the first thing to be done is the sorting, and in this much care and skill are required; for the different bags furnish different qualities of cotton, and it is necessary to produce yarn of uniform quality,

the cheapest rate. In order, therefore, to equalize the different qualities, the contents of all the bags are mixed together in the following manner. A space being cleared and marked out on the floor, the cotton contained in the first bag is scattered over this space, so as exactly to cover it; the contents of the second bag are, in like manner, spread over the first, and the cotton in all the other bags is disposed in a similar manner; men and boys tread down the heap, which is called a *bing* or *bunker*, until at length it rises up in shape and dimensions very much like a large hay-stack. Whenever a supply of cotton is taken from the bing, it is torn down with a rake from top to bottom, by which means it is evident the contents of the different bags are collected together in a mass of uniform quality and colour. In mixing different qualities of cotton, it is usual to bring together such only as have a similar length of staple. A portion of the waste cotton of the mill is also mixed in the bing, for making the lower qualities of yarn. For higher numbers, as well as for warps, a finer quality of cotton must be selected; and thus it will be seen that the formation of the bing is an important operation, the quality of the goods produced depending upon it.

In this state the cotton contains sand, dirt, and other impurities, and the fibres are matted together by the pressure they were subjected to in packing. To open the fibres, and get rid of the sand, &c., the cotton is put into a machine called a *willow*. This consists of a box or case, containing a conical wooden beam, studded over with iron spikes: this beam is made to turn round five or six hundred times in a minute. The cotton, as it is torn down from the bing, is put in at one end of the machine, where it is caught by the spikes, tossed about and shaken with great violence, and gradually driven forward to the other end. The sand and other heavy impurities fall out of the machine, through an open grating at the bottom; the dust and lighter matters pass off through a series of wire openings, and the cleaned cotton is sent down a shoot into the room below.

If the cotton is of fine quality, it is beaten, or *batted*, with hazel or holly twigs. For this purpose, it is spread upon a frame, the upper part of which is made of cords, and is quite elastic. A woman, with a rod about three or four feet long in each hand, beats the cotton with great violence, producing a similar effect to the bow-string of the Hindoo. Any loose impurities which remain fall out between the cords; seeds, and fragments of seed-pods, which adhere to the cotton somewhat firmly, are picked out by hand. By this method, the tangled locks disappear, the cotton is thoroughly opened, and made quite clean, without injuring the staple.

The coarser qualities are passed at once from the willow to the *scutching* or *blowing* machine, which does the work of batting, only in a more violent

Batting.

manner, and is, therefore, not adapted for fine qualities; but, in coarser spinning, is in general use to prepare the cotton for the carding-engine, as was the case at one of the mills visited by the writer. The cotton, as it was shot down from the willow, was received upon an endless band, called a *creeper*, ingeniously covered with laths of wood moving upon rollers: it supplied cotton to the various blowing-machines placed at equal distances across a long room. Each machine was attended by two lads, one of whom weighed a portion of the cotton, while the other spread it upon an endless band employed to feed the machine. This band was also formed of laths, placed crossways and fastened together, in preference to cloth, which is apt to sink along the middle, and thus feed the machine irregularly. Two or three of the laths were painted black, for the purpose of dividing the surface of the feeder into two or three equal parts. The feeder being constantly urged, with a slow motion, towards the mouth of the machine, it was the duty of the attendant, as soon as a black lath appeared, to begin to spread the weighed quantity of cotton, and to make it cover the whole surface until another black lath appeared: he was then ready to spread another weight of cotton. Thus, while one part of the feeder is constantly supplying the insatiable appetite of the machine, another part returns for a fresh supply. As soon as the cotton enters the jaws of the machine, it is seized by two rollers, and immediately exposed to the blows of the *batting-arm*, or beater, which is turned round with great velocity within a kind of drum, of which the arms of the beater form the diameter. The solid impurities fall through a grating, but the dust and lighter matters are sucked up through a shoot, in which the air is rarefied by a revolving fan. The wind produced by the batting-arm drives the light cotton filaments onward, where they are assaulted by another batting-arm: they are again urged forward, and blown with tolerable regularity over the surface of a wire-gauze drum, which is constantly revolving. Beneath this drum, and in close contact with it, is an endless band moving on rollers, which receives the cotton, and conveys it out of the machine. The pressure of the drum upon the band condenses the cotton into a filmy sheet; that is, the fibres cling together sufficiently to allow the cotton to be wound upon an iron rod as it leaves the machine, and in this state it is called a *lap*. The advantage of this is, that a uniform thickness can be presented to the carding-engine, which is a necessary condition.

In spinning fine yarns, this method of preparing the laps does not answer so well as forming them by hand. This practice was introduced by Arkwright, and it is done in various ways. In Mr. Houldsworth's mill, at the time of the writer's visit, the following method was adopted:—A boy was furnished with two qualities of cotton, contained in separate baskets: from one of these he took a certain quantity, and put it, together with a weight which hung from the beam of the scale, into the pan until the scale went down; the weight was then taken out, and its equivalent made up from the second basket.* The cotton thus weighed was taken to a canvass strip, one half of which was extended along a kind of frame near the wall, while the other half rested on the floor. The lad distributed the cotton over this cloth, batting and slightly raising it with a rod, and then flattening it with a kind of fan formed by the union of five rods. The boy then rolled upon an

FANS USED IN BATTING AND LAPPING.

iron spindle the portion of the cloth covered with cotton, and, in doing so, dragged upon the frame the remaining half, which was in like manner covered

* By this method cotton of various degrees of fineness may be mixed in any proportion. Suppose, for example, the manufacturer wishes to produce yarn from two qualities of cotton in the proportion of 3 of one to 2 of the other. The large scale weight will be 1 ¼ or ⅘. He first puts a small weight equal to ⅘ into the scale pan, with the first lot of cotton, and thus gets ⅘ of the quantity required; then taking out the weight he adds cotton from the second basket, to the value of ⅖ or ⅕.

FORMING LAPS BY HAND.

with cotton, and rolled up. The laps thus formed were placed in a heap in the lower part of the frame, ready for the carding-engine. In forming these laps the greatest precision is required, because the size of the yarn to be produced depends upon the quantity of cotton spread over a given surface, and any irregularity in the spreading is likely to interfere with the uniform thickness of the yarn. As the cotton varies slightly in weight, according as the weather is wet or dry, it is sometimes usual to weigh it with a cotton weight, formed by packing a quantity of cotton into a hollow copper tube or ball, pierced with holes. As this weight is about as much affected by changes in the weather as the cotton itself, an equality is thus preserved in forming the laps.

CARDING.

The cotton, which is still in a confused and tangled state, has now to be carded, upon the regularity and perfection of which process depends much of the success of spinning, and also of the beauty and durability of the stuff to be woven. It has been already explained, that a cotton card is a sort of brush, containing wires instead of bristles. The cards are made of bands or fillets of leather,* pierced with numerous holes, in which are fixed bent pieces of iron wire, called dents or teeth. Each piece of wire, by being bent, forms two teeth; thus: These must be of equal size and shape; they must stand at equal distances, and be equally inclined to the curved surface of the drum, round which the cards are to be lapped. The leather must also be of the same thickness throughout, or the teeth will not stand at precisely the same height.

When cards were made by hand, it was quite impossible to comply with these conditions, all of which are necessary to good carding. Much ingenuity has been exercised in producing a *card-making machine*, which the writer had an opportunity of inspecting at the works of Messrs. Curtis and Co., at Manchester; but it would be difficult to give more than a general idea of this wonderful piece of mechanism. The leather is first prepared by a machine, which cuts it into sheets and fillets of the proper length and breadth; each fillet is wetted and stretched to its full extent, so as to produce an even surface; it is then passed between rollers, against a nicely-adjusted knife-edge, which shaves it down to a perfectly uniform thickness. The fillet is then wound upon a roller, and made to pass between two guide-rollers, to a receiving-roller above the card-making machine, when the fillet is held fast and stretched by a clamp. The wire of which the teeth are to

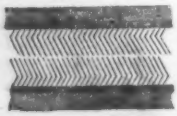
* By a recent improvement, the cards are formed of alternate layers of cotton, linen, and Indian-rubber.

be made is supplied from a drum placed at the side.

Matters being thus arranged, the machine performs its work in the following order:—Two prickers advance, and make two holes in the surface of the leather; a pair of sliding pincers next seize the wire, and wind off from the drum a length exactly sufficient for two teeth; a tongue of steel holds this piece of wire exactly in the middle, while a knife advances and cuts it off from that part of the wire held in the pincers. Steel fingers next advance, bend the piece of wire just cut off, and carry it forward to the holes previously made by the prickers. The points of the wire are seized on the opposite side of the leather, and a bar rises up and bends the two limbs so as to form a knee in each. A pusher then acts from the opposite side, and drives home the wire into the leather, which is then shifted by the guide rollers, and another wire is inserted as before.

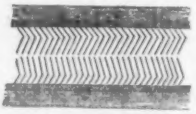
When this machine works at its ordinary speed, it is quite impossible to follow its various complicated movements, for it puts in two hundred teeth every minute, completing a length of twenty feet of card in a day; but the superintendent was so kind as to put the machine out of gear with the steam engine (which works ninety card-making machines in one room) and to turn it slowly by hand, whereby its beautiful movements were made intelligible. What adds apparently to the complexity of the machine, is the necessity of making cards for some purposes *ribbed*, that is, arranging the wires in lines crossing the fillet; while for other purposes the cards are *twilled*, that is, the wires form oblique lines across the fillet. When the cards leave this machine, all slight inequalities are removed by grinding; and the cards, when in use, are ground down from time to time, sometimes every day, until worn out.

The appearance of the cards, and their mode of action, will be understood from the following figure. If these cards be moved in opposite directions with a tangled tuft of cotton between them, the fibres will be seized by all the teeth—those of the top card will pull them one way, those of the bottom another, by which means all the curls and twistings of the lock will be opened and drawn



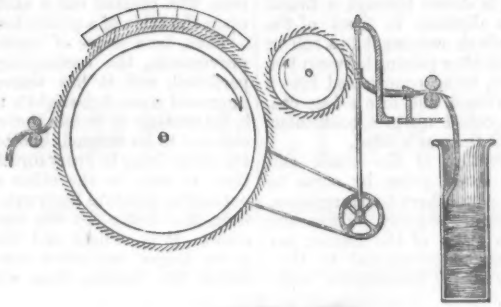
out, and the fibres made to lie side by side, or before each other. This effect may not be produced at once, but by repeatedly drawing one card over the other it will certainly be effected.

But in thus laying the fibres side by side, and end to end, each card takes up a portion of the cotton. To get the whole of the cotton upon one card, all that is necessary is to reverse the position of the two, and to place them as shown in the following figure, where



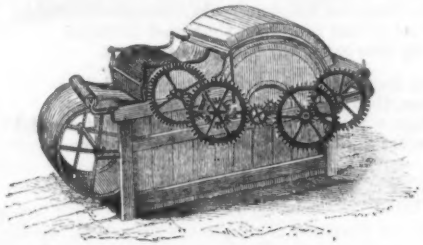
it will be seen that by drawing the upper card over the lower one, the teeth of the latter can offer no resistance, and thus it is stripped of its cotton.

In the carding-engine this principle is carried out on a large scale. A drum about three or four feet in diameter, and three or four feet in length, moving on a horizontal axis, is covered with narrow fillet cards parallel to the axis, a small space being left between the separate fillets. The upper part of the drum is covered with a concave frame, containing narrow cards, corresponding in form to those of the cylinder. The cotton lap is supported at one end of the engine upon a roller, which, by slowly turning, assists in unfolding it. As it becomes unfolded, it passes between two fluted rollers, which are pressed together by a weight hanging from the end of the upper roller. The cotton is then caught by the wires of the main cylinder, the teeth of which, assisted by the cards of the framework, arrange the fibres of the cotton, as already explained. After this they are taken off by a second cylinder, called a *doffer*, which moves in a con-



trary direction, and from this the cotton is removed by a very beautiful contrivance, called the *crank and comb*.

The inventor of the carding-engine is not known with certainty. It appears, however, that in 1748, Lewis Paul patented two different machines for carding, in one of which the cards were arranged on a flat surface, and in the other on a drum. The cards were arranged parallel to each other and to the axis of the drum, a space being left between every two cards. The wool was put on by hand, and the cardings were taken off separately by a moveable comb, the spaces between the cards regulating the substance of each carding. By this method the machines had to be stopped every time the cardings were taken off, and then had to be joined end to end to form the perpetual carding. The machine was not generally known and adopted in Lancashire for more than twenty years after the date of the patent. One of the first improvements was to fix to the machine a revolving cloth or feeder, on which a given weight of cotton wool was spread, by which it was conveyed to the machine. Arkwright further improved this by rolling up the feeder with the cotton spread upon it, as already explained, and allowing this gradually to unroll to feed the cylinder. Another improvement brought off the carded wool in a continuous fleece, forming a uniform and perpetual sliver. The doffer, which strips the wool from the large cylinder, turned off a carding of no greater length than that of the cylinder; but it was found, that by entirely covering the doffer with narrow cards, wound round in a spiral form, without having any spaces, the wool might be brought off in one unbroken fleece. But the method of stripping off the wool from the doffer was attended with many difficulties, which were at length overcome by the invention of the crank and comb. A plate of metal, finely toothed like a comb, is worked by a crank up and down over the doffer, so that, by slight and frequent strokes on the teeth of the card, it strips off the cotton in a continuous filmy fleece, which, as it

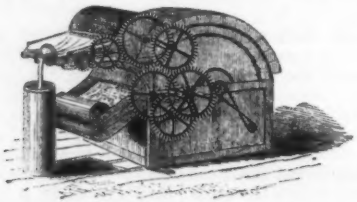


First Carding Engine.

comes off, is drawn through a funnel at a little distance in front of the cylinder, which reduces it to a roll or *sliver*. This after passing between two rollers, and, being compressed into a firm, flat riband, falls into a deep can, where it is coiled up in a continuous length until the can is filled.

The invention of the crank and comb has been given by some to Arkwright; by others to Hargreaves, the inventor of the jenny. Those who defend the claim of the former, say that it was communicated to Hargreaves by one of Arkwright's workmen, who chalked out a sketch of it upon the table of a public-house.

Thus, by a series of ingenious improvements, the carding-engine was perfected, and it has scarcely been improved since Arkwright's time. It is interesting to watch the cotton at one end in its tangled, knotted state, the fibres lying in every direction, and then to walk to the other end and notice the beautiful filmy web stripped from the doffer by the crank and comb. It is so light and flimsy that it no longer resembles cotton, but rather the delicate lines which the gossamer spider sometimes draws over the fields in autumn.



SECOND CARDING ENGINE.

In fine spinning, the cotton passes through two carding-engines; the first a coarse, and called a *breaker-card*, and the second, in which the teeth are finer, called a *finishing-card*. A number of cardings from the breaker-card are united together at the edges by passing them between the steel rollers of a *lap machine*; the new lap thus formed is wound upon a cylinder, and is then ready to feed the finishing-card.

(*To be continued.*)

AVARICE.

MONEY, thou bane of bliss, and source of woe,
Whence comest thou, that thou art so fresh and fine?
I know thy parentage is base and low:
Man found thee, poor and dirty, in a mine.

Surely thou didst so little contribute
To this great kingdom, which thou now hast got;
That he was fain, when thou wast destitute,
To dig thee out of thy dark cave and grot.

Then, forcing thee, by fire he made thee bright.
Nay, thou hast got the face of man; for we
Have with our stamp and seal transferr'd our right;
Thou art the man, and man but dross to thee.

Man calleth thee his wealth, who made thee rich;
And, while he digs out thee, falls in the ditch.

G. HERBERT.